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TWO FOSSIL DIPTERA.

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The finest fossil insect found at Florissant by the expedition of 1906 was a large and excellently-preserved Asilid fly. Although several fossil Asilidæ have been described from Europe, only one species (*Stenocinclis anomala*, Scudder, from Wyoming) has been described and named from the American tertiaries.

Microstylum Wheeleri, n. sp.

Length about 40 mm., of which 14 or a little less is head and thorax; wings rather short, about 20½ mm. long, faintly dusky, the veins dark; head and thorax black; legs very dark brown or piceous; abdomen reddish-brown, with triangular black markings on the first four or five segments, as shown in the figure; antennæ stouter than in *M. morosum*, Loew. The general form and proportions are shown so well in the figure that they need not be described. (Plate 4.)

The venation appears to accord sufficiently well with that of *Microstylum*. The radius and radial sector are quite normal, the latter branched as in *M. morosum*; radiomedial cross-nervure present and normal; the cell between the ultimate branches of the media is essentially as in *M. morosum*, the upper branch being even more bowed basally, ***but the end of the upper branch reaches the margin a considerable distance from the lower branch of the radial sector;*** cell V_3 (Comstock's Manual), which I consider to be enclosed within the branches of the cubitus (following my interpretation of the venation in the Nemestrinidæ), is spindle-shaped, with the upper margin not far from straight, but the lower strongly bowed; from its apex it sends a cross-nervure to the media, reaching the latter at the point of forking, and a straight nervure (end of the cubitus according to my interpretation) to the margin; there was no doubt a cross nervure passing from its lower side to the margin, but this place is obliterated; the cubital cell (viii, Comst.) is very narrow.

According to my interpretation (Amer. Jour. Sci., April, 1908) the strong bend in the upper branch of the media is perhaps a relic of a condition in which a cross-nervure (found in most Nemestrinids) passed from thence to the radial sector; no trace of this now remains.

Hab.—Miocene shales of Florissant, Colorado, Station 14 (*T. D. A. Cockerell*, July 8, 1906). The genus *Microstylum*, Macquart, has at present four species in our fauna; two from Dallas, Texas; one from Pecos River, on the borders of Texas and New Mexico, and Kansas; and one from Mexico. The fossil is named after Dr. W. M. Wheeler, in recognition of his important contributions to dipterology, and in remembrance of the fact that he was present when it was found.

Proctacanthus Philadelphicus, Macq. (specimen from Mesilla Park, New Mexico, caught preying upon a honey-bee), compared with *M. Wheeleri*, shows the following important differences in the venation:

1. The cell in the forks of the radial sector is conspicuously longer and narrower.

2. The apex of cell 1st V_2 (Comst.) is rather broadly contiguous with the base of cell V_1, or, in other words, the lower branch of the media is sharply angled at the base, the point emitting the cross-vein to cell V_3.

3. Cell V_3 (enclosed within the branches of the cubitus, according to my view) is cuneiform, pointed basally, but broadly obliquely truncate apically, and connected with the margin by only one nervure.

Dialysis revelata, n. sp. (Leptidæ).

Length, 18⅔ mm.; proportions about as in *D. rufithorax*, Say, except that the abdomen is somewhat longer; head small, diam. 2 mm. or a fraction over, appearing black; thorax reddish-brown (perhaps ferruginous in life), diam. 4 mm.; abdomen pale reddish-brown, with whitish bands at the bases of the segments, the second and third especially having about the basal half whitish; wings ample, about 13⅓ mm. long, the nervures pale ferruginous; anterior legs pale reddish; middle and hind femora dark brown or black, but their tibiæ and tarsi paler; length of hind femora about 6 mm., of middle femora, 5½ or a little more.

Venation like that of *D. elongata*, Say (*dissimilis*, Walker), as figured by Williston from Austen's drawing (Kans. Univ. Quarterly, April, 1895, p. 264), except as follows:

1. The subcosta reaches costa about 8 mm. from base of wing, thus considerably beyond the middle.

2. Vein R_{2+3} (following the nomenclature of Comstock and Needham, Amer. Naturalist, XXXII, p. 233) is strongly bent downwards where R_{1+5} leaves it. (Such a bend is slightly indicated in *Leptis*.)

3. The discal cell is longer; on its upper side, the part beyond the cross-nervure to the radius, is much more than twice as long as that before it.

4. The cell M_3, or fifth posterior (cell in the forks of the cubitus, according to the nomenclature proposed by me for the Nemestrinidæ), is present, and rather widely open at the apex.

5. The cubital cell (Comst. and Needham) is also open at the apex.

It has been shown by Mr. C. W. Johnson (Ent. News, 1897, p. 118) that the presence of the fifth posterior cell is not a generic character in this group, since in *D. rufithorax* it is present or absent, without even specific difference.

Hab.—*D. revelata* is from the Miocene shales of Florissant, Colorado, at Station 14 (*W. P. Cockerell*, 1907). I submitted a drawing of this species to Prof. A. L. Melander, and it is to him that I am indebted for the suggestion that the species belongs to *Dialysis*. It is remarkable for its large size, and some venational characters above indicated, but I cannot find any sufficient reason for regarding it as another genus. The characteristic flexure of R_4 is exactly as in *Dialysis*.

This is the first American fossil Leptid. Of Leptidæ in the broad sense (including Xylophagidæ) numerous species have been described from Baltic amber, but only one (*Xylophagus pallidus*, Heer.), from other rocks, namely, from Aix. All of the European fossil Leptids are from the Oligocene.

NOTES ON TENTHREDINOIDEA, WITH DESCRIPTIONS OF NEW SPECIES.

BY S. A. ROHWER, BOULDER, COLO.

PAPER I (SPECIES FROM COLORADO).

The term middle fovea is used in these descriptions, and I expect to use it from now on, for the fovea between the antennæ. This is what Mr. C. L. Marlatt (Rev. of the Nematinæ of N. Am., Tech. Ser., No. 3, Dept. of Agriculture) calls the antennal fovea. The term antennal fovea in my descriptions from now on will mean the fovea at the base of each antenna. "Ocellar basin" is the basin in which the lower ocellus is placed. "Middle carina" is the carina that is sometimes found between the antennæ.

I am greatly indebted to Prof. C. P. Gillette for the loan of the Saw-flies belonging to the Colorado Agricultural College. Also to Prof. T. D. A. Cockerell for many valuable suggestions, and to Dr. A. D. MacGillivray for permission to describe some Saw-flies which he had named in manuscript.

It is my plan to have a series of papers on Saw-flies, in some cases giving notes and descriptions of new ones, and in others giving tables of the species of America, north of Mexico.

June, 1908

Euura brachycarpæ, n. sp.—♀. Length about 5 mm. Head with a few fine punctures on vertex. Clypeus shallowly emarginate, lobes broad, rounded, antennal foveæ large and deep; middle fovea (antennal fovea of Marl. Rev. Nematinæ of N. Am.) elongate, well defined, ocellar basin shallow, better defined by the lower wall; a slight depression around each lateral ocellus; 2nd, 3rd, 4th, 5th joints of antennæ subequal; thorax smooth, shining; tarsal claws cleft, rays subequal; intercostal vein its own length before basal; discal cells of hind wings equal on the outer margin, the lower one is much broader than the upper; sheath broad, rounded on lower apical margin; cerci long and slender; apex of abdomen and sheath with long white hairs. Colour shining black; mandibles, except apex, which is piceous, labrum, edge of clypeus, tegulæ, small spot on angle of pronotum; legs, except bases of coxæ and a line on femora, beneath clear reddish-yellow; apex of venter is sometimes piceous; wings hyaline; nervures brown; costa and base of stigma pallid.

The ♂ does not differ much from the ♀; the apical joints of the antennæ are rufous, the costa is darker, the femora are usually darker, the posterior are sometimes piceous, and the posterior tarsi are usually infuscate.

One ♀ has the posterior and upper orbits ferruginous, and the superclypeal area and whole of clypeus reddish-yellow. The upper orbits in a good many specimens are rufous.

Hab.—Florissant, Colo., between June 16 and July 24, 1907, but mostly on July 7, '07, when the type was collected. "On *Salix brachycarpæ*" (S. A. Rohwer). An Euura gall, common on this Salix at Florissant, and the only one I found there is much like *Euura salicis-ovum*, and I think it must be the gall of *Euura bachycarpæ*, although no adults were raised.

This species is most nearly related to *E. albiricta*, Cress., but may be known from that species by being larger, having no testaceous spot between eyes, the posterior angle of pronotum being reddish-yellow, and the black of the femora in the ♀ being a line beneath.

Euura parva, n. sp.—♀. Length about 3½ mm. Head with small, rather dense punctures, vertex rounded; clypeus circularly emarginate, lobes broad, rather pointed; antennal foveæ rather deep, longer below antennæ; middle fovea elongate open at the top; ocellar basin very shallow at the top, but fairly distinct nearer the antennæ; 3rd and 4th

joints of the antennæ equal, next two equal and the last three subequal; thorax with fine dense punctures above, smooth beneath and on sides; tarsal claws minutely cleft, rays equal; venation normal, lower discal cell wider than upper, the lower and upper equal on outer margin; sheath broad, rounded on lower apical margin; cerci long and rather stout; sheath clothed at apex with hairs. Colour dark brownish; clypeus, labrum, mandibles, except tip, cheeks, orbits, tegulæ, posterior angles of pronotum, all of the legs, venter and sheath reddish-yellow, the abdomen above of the paratype is pale piceous; antennæ beneath and apical joints dull ferruginous, wings hyaline, nervures pale brown, costa and base of stigma paler.

Hab.—Ft. Collins, Colo. Type collected April 24, 1906; paratype May 21, 1906.

This species seems quite distinct, and is easily distinguished by its small size from all except *albiricta*, Cress., from which it may be known by the more abundant pale markings.

Cephaleia punctata, n. sp.—♀. Length about 12 mm. Head almost as wide as thorax, much broader above than beneath; eyes placed well forward; vertex very broad, flat; a broad low carina between antennæ and on basal part of clypeus; clypeus truncate, broader on the lower part; left mandibles tridentate, right bidentate, inner tooth largest; antennæ long, slender, extending somewhat past the base of abdomen, first joint wider and about three times as long as second, third longer than four + five; ocellar region with dense deep punctures; vertex and sides of head with deep, scattered punctures; lateral lobes of mesonotum and scutellum with deep, scattered punctures, similar to those on the head; mesepimera with deep punctures on lower and extreme upper part, the middle somewhat corrugated; metathorax and abdomen smooth; claws with an inner tooth about one-third from apex; four hind tibiæ with a pair of spurs about one-fourth (or more) from apex, and another single spur about a fourth above these; second transverse cubital uniting with radius about one-third of its length beyond transverse radius. Colour shining black; anterior margin of clypeus, a line in middle, inner orbits broadly, large spot on upper inner orbit, cheeks, broad band on side of head, extending from cheeks to occiput, where it joins with a crescent formed by a line from top of eye to occiput, then curving downward, crescents uniting, the lower outside part of crescent is a thin line, so that on one side there is a break, two large elongate spots on vertex (the

heavier marking of the vertex and occiput together form a sort of M, the outer lines being heavier), posterior margin of pronotum, tegulæ, triangular spot on anterior lobe of mesonotum, posterior and lateral half of lateral lobes of mesonotum and base of scutellum, these form a broad U, to lines on under side of prothorax, broad band on mesepimera, line above posterior coxæ, light yellow; abdomen, except a black spot on apex of venter around sheath, and sheath, legs from apex of femora, mandibles, antennæ from first to about twelfth joint, rufous. Wings somewhat fuscous, a band from base of stigma across wing to the apex of second discoidal cell and posterior margin fuscous; nervures brown, stigma at apex and base of costa lighter.

Habitat.—Florissant, Colo., July 12, 1907. (S. A. Rohwer.)

This species may easily be separated from the other members of this genus (*C. Canadensis*, Nort.; *C. Quebecensis*, Prov., and *C. ochreipes*. Konow gives *ochreipes* as a syn. of *Canadensis*, but I believe it to be distinct) by the triangular and U-shaped spots on upper side of mesothorax. I have gone through all the descriptions of the N. Am. species of the genus Lyda in the Cressonian sense, and it is none of those, although in coloration it is nearer some species assigned by Konow to other genera than that in which this species is placed. It belongs to the sub-genus *Cephaleia*, as given by Konow in the "Genera Insectorum."

Emphytus Gillettei, n. sp. (=*E. Gillettei*, MacG., M.S.).—♀. Length about 8 mm. Form similar to *E. mellipes*. Head smooth, with a few small punctures; ocellar basin with sloping walls, almost united with the middle fovea, the walls of which are not as sloping; antennal ridge prominent, extending into clypeus; clypeus deeply, angularly emarginate, as long as the second joint of antennæ; a furrow from base of each antenna to occiput; a furrow between lateral ocelli; middle fovea large; four apical joints of antennæ constricted at base, third joint a trifle the longest, four and five subequal; thorax, in general, punctured like head; angles of pronotum, scutellum and postscutellum with denser and larger punctures; lower part of pronotum and a spot on mesepimera at side irregularly roughened; first joint of tarsi as long or a little longer than 2+3; inner claw tooth long, making the claws look bifid; transverse radial curved, received in middle of cell; second recurrent nervure in basal third of second cubital; lanceolate cell of hind wings shortly petiolate at apex; abdomen with fine, rather dense punctures; sheath broad, obtusely pointed at apex above, rounded beneath. Colour black;

apical joints of antennæ and mandibles, except base, dark rufous ; tegulæ, cenchri, spot on middle of basal plates above, two spots on fourth abdominal segment above (these spots are sometimes confluent and form a band above), trochanters, extreme apex of posterior coxæ, a small band on posterior tibiæ at base, white ; palpi, anterior tibiæ and tarsi beneath, intermediate tibiæ and tarsi beneath somewhat, pallid or pale testaceous ; posterior femora, tibiæ and tarsi yellow-red ; tibiæ and tarsi infuscated ; pleura with short white hair. Wings dusky-hyaline ; nervures and stigma dark brown.

Habitat.—Colorado, May 21, 1901 ; also specimens from Denver, Colo., May 30, 1902, and one from Boulder, Colo., May 17, 1902. (S. A. Johnson.) Specimens and type in collection of Colo. Ag. College.

The posterior legs are sometimes darkened, but there is always a strong rufous tinge. The sculpturing of the head varies somewhat, but the markings are always present, although sometimes faint.

This species seems to fall between *E. mellipes*, Harris, and *E. cinctipes*, Nort. It may be known from *E. mellipes* by the dark, almost entirely black, four anterior legs, the white on the fourth abdominal segment not going all the way round, etc. From *E. cinctipes* by having the posterior femora and tibiæ yellow-red, stigma unicolour, etc.

Emphytus Coloradensis, Weldon.—(CAN. ENT., Sept., 1907, p. 304.) The following notes may be useful in determining this remarkable species. They were made from the type, which is a male. Head densely punctured ; clypeus emarginate ; antennæ stout, joints somewhat rounded out beneath, rather short, malar space distinct ; thorax punctured, but not as densely so as head ; claws simple ; transverse radial joining the radial nervure beyond the second transverse cubitus ; wings subhyaline. Length about 5 mm.

This species is quite distinct from all American ones.

Habitat.—Little Beaver Creek, Larimer Co., Colorado, July 4, 1896 (C. P. Gillette). "Taken above timber line, 11,500 ft. altitude."

Hoplocampa bioculata, n. sp. (= *H. bioculata*, Macg., M.S.), ♀. Length about 5 mm. Head not as wide as thorax ; vertex rounded ; covered with very small dense punctures ; antennæ placed in two deep, large foveæ, which extend to clypeus ; the middle fovea small, but quite distinct ; third, fourth and fifth antennal joints subequal ; clypeus broadly, angularly emarginate, lobes broad, rounded ; labrum rounded at apex ; thorax with fine dense punctures above, almost smooth beneath ; intercostal vein more than its own length basal to basal vein ; lanceolate cell

of hind wings longly petiolate at apex ; upper discal cell extending beyond lower ; claws simple, first tarsal joint of intermediate legs nearly as long as joints 3 + 4 + 5 ; sheath broad at base, pointed at apex above, rounded below. Colour black ; clypeus, labrum, mandibles, except at apex, lower orbits and tegulæ, luteous ; palpi, spot on upper orbits, antennæ beneath, tibiæ and tarsi reddish-brown (the density of this colour varies somewhat) ; anterior femora sometimes the colour of the tibiæ. Wings hyaline ; nervures and stigma pale brown, stigma lighter in middle.

Habitat.—Dixon Canon, Larimer Co., Colo., May 9 (C. P. Gillette) ; also specimens from Ft. Collins, Colo., May 11, 1899 ; 2 ♀'s, Foothills, near Ft. Collins, Colo., May 15, 1897, flowers of *Amelanchier alnifolia* (C. P. Gillette) ; 1 ♀, Dixon Canon, Colo., May 6, 1894 (C. F. Baker).

This species is quite distinct. It seems nearest to *H. obtusa*, Klug., from Georgia, from which it may easily be separated by the colour of the basal plates, etc.

Lycasta fusca, n. sp. (= *L. fusca*, MacG., M.S). ♂. Length, 6 mm. Head a little wider behind eyes ; vertex broad ; malar space distinct ; clypeus broadly emarginate, lobes small, pointed ; labrum slightly emarginate ; superclypeal space depressed into a furrow ; middle fovea distinct, broadening above, where it is joined by two furrows, which come from inner orbits and extend to vertex ; ocellar basin small, but well defined ; antennæ reaching about to apex of scutellum, third joint distinctly longest, last six subequal ; thorax, as is the head, with fine punctures ; punctures on scutellum and postscutellum well defined ; tarsal claws simple ; transverse radial received in apical third of cell ; lanceolate cell shortly contracted, or with a very short broad cross nervure ; lanceolate cell of hind wings petiolate at apex ; abdomen with irregular small punctures ; seventh ventral segment broadly rounded at apex. Colour black ; face below antennæ, pleura and legs with sparse, short gray hair ; antennæ with very short, sparse gray hair ; in two specimens the anterior tibiæ and tarsi are pallid beneath, infuscated. Wings dark fuscous, shining in certain lights with green and crimson ; nervures and stigma black.

Habitat.—Ft. Collins, Colo., June 4, 1899 ; also June 4, 1901, and Horsetooth Gulch, Larimer Co , Colo., April, 1895 (C. P. Gillette and C. F. Baker). Collection of Colo. Agric. College.

This species is quite distinct from all other members of the genus, and may be easily known by being entirely black.

FURTHER NOTES ON ALBERTA LEPIDOPTERA.

BY F. H. WOLLEY DOD, MILLARVILLE, ALBERTA.

(Continued from page 156.)

39. *Chionobas Macounii*, Edw.—During June (22nd–24th), 1905, Mr. Hudson and I came across the true habitat of this species. About ten or twelve miles west of here, in the "Billings's Mill" locality, is where we had occasionally taken a few specimens in previous years, flying near the foot of the spruce-covered hills. Most of the hills are heavily timbered on the north slopes, the spruce timber merging into poplar scrub at the summit, and the southern slopes are grass-covered and void of timber. Amongst the poplar scrub, and at the edge of the spruce, is where we found both sexes quite fresh, the males comparatively common, on the above dates. The light colour of the upper side makes it a more conspicuous object than *jutta* when on the wing, and though, perhaps, just as shy of approach, its flight is rather slower, and it usually settles on fallen timber instead of high in standing trees like that species. The difficult nature of the ground prevented our taking more than we did. Some males show a decided tendency to develop a sex-mark, thus showing a closer relationship to *gigas* than was previously supposed. *Jutta* was common at the same time, in amongst the timber, and usually at the foot of the hills, where *Macounii* was far less often seen.

41. *C. Alberta*, Elwes.—For "below the cell," in line 12, read "opposite the cell." The species has been very scarce of recent years.

42. *C. varuna*, Edw.—Mrs. Nicholl found this species common on the Kootenai Plains, near the head of the Saskatchewan, in mid-July.

44. *C. Beanii*, Elwes, = *subhyalina*, Edw.—Mrs. Nicholl and I found this common on the only three peaks we visited near Lake Louise, Laggan, on July 19th and 20th, 1904. These are Mts. Piran, Fairview and Saddle Peak. (For altitudes vide under *astarte*.) We saw it then only on or very near the extreme summits, though Mr. Bean writes in Edw. Butt. N. Am., III: "Its observed range of altitude extends from 7,300 ft., for occasional stragglers, timber-line at Laggan being 7,000 ft., to 8,500 ft., as the males habitually frequent rock wastes at the points and ridges of the peaks. The females seldom reach such localities, but chiefly inhabit sedgy slopes in a belt of altitude between 7,500 and 7,800 ft." We met with but few females, but one from Fairview on 19th is labelled "Near summit; over 8,500 ft." Mrs. Nicholl found it common on all

the high peaks of the Rockies, where she collected during that season, and says: "I never found the female lower down, as was the case with *astarte*." She also met with it commonly during her trip far north of Laggan last summer. On July 16th last I caught nine specimens on Piran, including one or two females, during cold weather, with very little sunshine. During a short glimpse of shine, if one did not get up in sight of its own accord, I could occasionally stalk one up, and marking it down, often found it sleepy and easy to catch. One that I marked, I dug out from amongst the stones nearly two feet down. On this occasion I saw more on the lower ridges at approximately 8,000 feet, than at the extreme summit, and there is much easier footing. On the 18th, warm and sunny, I found it fairly evenly distributed, though scarcely common, all over the southern and eastern slopes of the mountain for about 7,500 feet up, but confined my attention more to other species. But late in the afternoon I took a female, in probably her first flight, within 200 feet of Lake Agnes, that is, below 7,000 feet and within the timber line. I should mention that this was during an abnormally late season. I believe, however, that the summits may produce insect life earlier than the lower levels, as the snow often goes from these first, and the rock-piles radiate the sun's heat tremendously. In hot weather it is rather shy, but does not make very long flights. With caution it is easily stalked. I have also taken this species on Mt. Stephen, Field, July 7th, Mt. Field on the 8th, and saw one settle close to me on the summit of a mountain about eight miles south-east of Windermere, B. C. This was probably not above 7,000 feet, as timber just reaches the summit. Specimens that I have seen in Pacific Coast collections from Mt. Cheam are a little shorter in wing than the Rocky Mountain form, in this respect resembling *Brucei*. I am indebted to Mr. Taylor for one of these specimens.

46. This is *Thecla iroides*, Bdv., according to Mr. Cook. I have compared a short Calgary series with specimens labelled *iroides*, from Kaslo, Victoria, and Wellington, B. C., and they differ only slightly in colour, the B. C. specimens inclining more to purple or violet beneath. Some local specimens match them very closely, however. Dr. Dyar says: "As between the two I should call your Calgary species *augustus*." Mr. Cook claims, in CAN. ENT., XXXIX, p. 146, that the two are separable by early stages. My dates are from May 12th to 29th. Mrs. Nicholl records it from Banff in May.

47. This is the form described by Messrs. Cook and Watson as *Incisalia polios* (CAN. ENT., XXXIX, 202, June, 1907), and some of my few specimens agree well with their figures on Plate 5 (July). It is stated after the description that "*Polios* most nearly resembles *Mossii*, Hy. Edw., from which it differs in the presence of the hoary margin of the primaries, the broad hoary area of the secondaries, . . . and in the colours of the fringe." And further: "Undoubtedly *polios* has been confused by collectors with *irus*, *Henrici* or *Mossii*," and comparisons are made with these species. Dr. Skinner, in Ent. News, XVIII, 327, says: "I do not consider it specifically distinct from *T. Mossii*. . . . . The species extends across the continent from the Atlantic to the Pacific, ... and the type (♂, *i. e.*, of *Mossii*) comes from Esquimault, V. I." My dates are from May 5th to June 29th. The latter date is exceptionally late, but the specimens are in fine condition.

50. *T. titus*, Fab.—Red Deer River, July 25th and 26th, 1907, not rare.

55. I have described this form as *arethusa* in CAN. ENT., XXXIX, 169, May, 1907. It appears to be somewhat local, as I have not so far met with it elsewhere than in the two localities mentioned under the description. A few days after taking a series near Billings's Mill, I spent an afternoon hunting closely for it over what appeared to be precisely similar ground ten miles distant, without finding a specimen. Dates of capture, July 5th to 20th. Dr. Skinner writes to me: "I consider it a variety of *phlæas*, and nearer to that than var. *Americana*." He had previously listed the form as *phlæas* in Sup. 1, page 18, of his Catalogue. Mrs. Nicholl came across it far north of Laggan, and I am indebted to her for three pairs, labelled "Brobokton Creek, July 5th–13th, Aug. 12th, 13th," and "Brazeau Creek, July 16th." One ♀ is my *arethusa* exactly, but some of the rest approximate the eastern form very closely, one ♀ being inseparable therefrom. Mrs. Nicholl took other specimens, and Sir George Hampson says they are like a form he took in Norway. I certainly have a very similar male labelled "Norway sept.," which is the only European specimen sent me by Bang Haas as *hypophlæas*.

56. *Chrysophanus Snowi*, Edw.—I found this, somewhat sparingly, on Mts. Fairview and Piran, at Laggan, on July 19th and 20th, 1904, chiefly on the same ground as *A. Alberta*, from about 8,000 feet up, but occasionally on bare slides a little below the timber line. Mrs. Nicholl writes: "A high mountaineer, never seen below 7,000 feet. Widely

distributed over the high Rockies, but seldom plentiful." She reports finding it rather common far north of Laggan last summer. Some of my females have the centre row of black spots on primaries elongate as in the var. *fasciata* of *hypophlæas*.

Nearly all my blues are with Mr. Fordyce Grinnell, who is making a special study of the genus, and who, I hope, will soon straighten my species out. Meanwhile I am able to make these few additions to my former notes.

[60a. *Lycæna lygdamas*, Doubl.. var. *oro*, Scudd.—I cannot look upon the specimens I referred to under this head as being distinct from what I have listed as *Couperii*, which is very variable. Dr. Fletcher, in commenting upon Mrs. Nicholl's record of *Couperii* from Calgary and the Rockies, says: "The mountain form here referred to is called *lygdamas* by Canadian collectors, following Mr. W. H. Edwards."]

63. *L. shasta*, Edw.—I have not since seen the species from anywhere near Calgary, but have found it, somewhat sparingly, on either side of the Red Deer, north-east of Gleichen. It there frequents dry gravelly ground, preferably at the top of isolated knolls so common in the deep, water-worn coulees in that alkaline country, or close to the edge of banks, seeming to be fond of the flowers that grow in such situations. A few specimens were found in the coulee bottoms, June 20th to July 9th, though on the latter date most of my captures were much worn. I cannot distinguish the form from specimens received from South Park, Colo. The Red Deer locality is strictly prairie, and its occurrence there is rather peculiar.

65. *L. acmon*, Doub.-Hew.—I have taken it on the Red Deer, flying with *shasta*, but even less commonly. With Mr. Hudson I also took one or two in a dry pit about a mile from Gleichen station, July 5th to 9th, all in fine condition. Dr. Fletcher says: "It is the ordinary form of *acmon* not uncommon on the plains." Specimens in my collection from Colorado and California, which Dr. Fletcher tells me are the same species, have large spots, and most of them a wide red band beneath. It is not unlikely that the Banff specimen previously recorded may be *battoides*.

68. *Pieris sisymbri*, Bd.—Until recently I confused this species with a dark var. of *occidentalis*, and I find that my Pine Creek records were erroneous. I have, however, a pair of *sisymbri* from Laggan, received some years ago from Mr. Bean, the female being greenish-yellow, and dated "end of May." These, with a third specimen, female, from Glenwood Springs, Colo., form a basis for comparison. The Laggan male

alone has black veins on primaries above, a character possessed by none of my *occidentalis*. Quite the most obvious difference is in the marginal venular markings wherever present. In *sisymbri* these are of uniform width, not tending to widen out on the extreme margin. In *occidentalis* they widen out on the termen, usually joining above, occasionally beneath. Holland's description of the under side of the secondaries of *sisymbri* fits some of my *occidentalis* exactly, but though in an occasional specimen of *occidentalis*, the tendency there of the vein linings to broaden on the margin is very slight, their strongly dentate form on the primaries in all my specimens is unmistakable.

69. *P. protodice*, Bd.-Lec.—Except for an occasional female, I find I can now separate this from *occidentalis*. Generally speaking, the markings are all much heavier and darker in the latter, the marginal spots on primaries of *protodice* male being reduced to insignificance, and the secondaries beneath almost immaculate. There seems, too, a stronger tendency in *occidentalis* for the inner row of black blotches to form a band. In the females these differences are less pronounced, the black markings in both species being rather strongly developed, and, leaving the dark, strongly-marked form *(calyce?)* out of the question, the vein linings of the under side of the secondaries are occasionally very much alike. I have tried to find a constant feature in the inner submedian interspaceal spot on primaries. In *occidentalis* this is rather small, with a rather obvious tooth outwards. In *protodice* it is usually much larger and less obviously toothed. This, however, sometimes fails me in the females; in particular, a specimen from Chicago, where *occidentalis* surely cannot be found, as well as at least one of my Calgary specimens, looking equally well in either series. The outer margin of primaries in *occidentalis* seems nearly straight or slightly convex. In *protodice* it is usually slightly concave. This, however, is a variable feature. *Protodice* flies here in June and July, and a second brood emerges at the end of August. Like so many other species, it has been rather scarce here of recent years, and I am very poorly off for material.

72a. *Anthocharis creusa*, Doub.-Hew.—Mrs. Nicholl took a specimen at Banff on June 2nd, 1904, and I took one there myself on July 1st, 1907, quite fresh. I also took two or three in fine condition, and saw twice as many more at timber line on Mt. Piran, on July 17th last. The Calgary specimen previously recorded is probably the same species. In Rep. 36, Ent. Soc. Ont., 1905, p. 79, Dr. Fletcher says: "In *creusa* the

black discal spot on primaries beneath is cut off square at the bottom, where it runs along the vein. In *ausonides* this spot tapers." In the two species, as I believe them to be, occurring here, this character is not constant either above or beneath. My specimens of *creusa* are considerably smaller than the average of *ausonides*, though larger than the smallest. The mountain specimens have rather more black basal shading above, but the Calgary specimen has scarcely more. But all have very much heavier reticulation beneath, with more green and less yellow, and are more thickly dotted above the costal margin of primaries on both sides. I have ventured to doubt whether Dr. Holland's fig. 23 on Plate XXXII is *creusa*. The reticulations show through, and look suspiciously thin, the costa is perfectly clean, and I have manifest *ausonides* with the discal spot just as squarely cut. Dr. Skinner, however, says that the figure is probably correct, and adds that *creusa* is so very close to *ausonides* that their exact relationship is not known. Mrs. Nicholl reported *creusa* to be not rare at Field during the first week in June of last year, and I took a fresh specimen near timber line on a mountain south-east of Windermere on July 13th. These appear to be the first records for B. C.

73. *Colias elis*, Streck.—Mrs. Nicholl writes concerning her 1904 trip: "*Elis* was scattered rather sparingly over all the high mountains of the main chain of the Rockies at an elevation of 6,500 to 7,500 feet. I took the greatest number on the slopes of a mountain above Hector Lake (= Wapta Lake, Hector, auct.). It also occurred at Lake Louise, Mt. Assiniboine and mountains above Simpson River." I think her Lake Louise record refers to a specimen she took on Mt. Piran, above Lake Agnes, on July 20th, when I was with her. It was probably its first appearance. Of her 1907 trip she writes: "Wilcox Pass, or rather the valley just south of it, is the headquarters of *C. elis*, which swarms there, with a few *christina* in company. It is evidently a northern insect, and is the commonest Colias on the Athabasca." She kindly sent me a few of the specimens, in fine condition, dated July 27th.

74. *C. eurytheme*, Bd., var. *eriphyle*, Edw.—Whilst admitting that I have made no special study of Colias, and have very little outside material in the *eurytheme* group, and moreover, that some forms of the genus are as variable and confusing as there are to be found in Euxoa amongst the noctuids, nevertheless, I find it hard to accept the two forms passing in the west as *eriphyle* and *eurytheme* as being of the same specific

identity. That the two are very closely allied there can be no doubt, occasional specimens being questionably separable even by colour. Yet the general impression conveyed by a series, as well as the regular occurrence of two broods of *eriphyle* in this district, as against the capture of *eurytheme* during one season only, clearly suggests two species. Mr. Bean, whilst at Laggan, perhaps made at least as close a study of the North American species of this genus as any man has yet done, and a few years ago I had a short correspondence with him upon this point. He wrote : " When I last studied the *eurytheme* problem the status seemed to be that in the north *eurytheme* breeds true and *eriphyle* breeds true. But the claim was made that in Colorado eggs of one form had sometimes developed the other. *I have often bred each form, and never had mixed results.* It was necessary to use great care in gathering the plants, to avoid smuggling in stray eggs, and there a doubt comes in as to the occasional mixed results." The above is significant. The italics are mine.

75a. [*C. occidentalis*, Scud.—The Lacombe specimens I referred to under this name are without much doubt the same as the " pale lemon-yellow form " I mentioned under *christina*. To me, however, they are separable from true *christina* solely by colour, the variations, in both the colour forms, of the discal spots and width and shape of border, being enormous, and in the females almost unlimited, though from personal observation of the two—one form being sometimes fairly common on days when the other is scarcely to be seen—I should strongly suspect two species. After my previous publication, Dr. Fletcher expressed a doubt to me whether a yellow *christina* ever existed. My reference was based on a letter received seven years previously from Mr. Bean, which I showed Dr. Fletcher, and from which I now quote. As I mentioned above, I accept Mr. Bean as being at the time one of the highest authorities on Colias, particularly as he bred several species on a somewhat extensive scale. He wrote from Laggan, discussing the opinion of a third person to whom he had showed his enormous local collection: "I had shown him a great series of *christina* bred and caught, ranging all the way from the ultra orange forms of Assiniboia to the local extreme of unmarked white females and yellow males with no orange at all. . . . . He admits himself puzzled by the very slightest one of all the difficulties *christina* presents, the colour variation, and that, although *the unity of the colour forms has been fully established.*" The italics are mine. I have a male

and two females of the species known as *occidentalis*, from Wellington, B. C. They seem to differ from some of my specimens only in having rather more of the basal shading of black scales above, except that I happen to possess no Calgary females of that exact shade of colour, viz., greenish-yellow. A series of thirty Calgary females of the *occidentalis-christina* group are either orange, yellow or greenish-white, and scarcely any two even nearly alike in either colour or markings. Of much the same colour as the Wellington females are a few I took at Windermere, July 10th to 13th. These, with the males from the same place, are like my No. 75a in the very restricted area of the basal shading, but have a rather smaller discal spot on secondaries, which, in the males, shows through scarcely darker than the ground colours above. By these characters they are, without much doubt, identical with a species of which I have two pairs from Osoyoos, B. C., and a male from Pullman, Wash., which Mr. Elwes, Dr. Barnes and Dr. Fletcher all tell me are *emilia*. The male border is narrower than in most Calgary specimens of the group, in which, however, it varies much, even in orange *christina*, as does also the size and colour of discal spots in my 75a series. That this includes another species, *emilia*, is not impossible, but I do not know how to pick them out. Dr. Fletcher's likening the male to a large *interior* in his notes on Mrs. Nicholl's 1904 list, will not do, as in that species the band is not cut through by yellow veins, as seems usually the case with *emilia*.]

76. This species is *C. interior*, Scud., and agrees with specimens from Nepigon, Ont.

77. *C. nastes*, Bd.—Dr. Skinner, in telling me that *Streckeri*—erroneously listed by him in his Cat. Supp. 1 as a species—was described by Grumm Grohimailo from Laggan specimens as a var. of *nastes*, adds: "As far as I can tell there is little, if any, difference between the Alberta *nastes* and those found in Europe." I found the males just coming out on Mt. Piran on July 20th, 1904, on shaly *A. Alberta* ground. All I took that day were over 8,000 feet. Mrs. Nicholl reports it common at very high levels on every mountain she explored in the Rockies that year. She writes (under *nastes*): "It varies considerably, and I think that those from Mt. Assiniboine, the most southern point at which I found them, are paler and yellower than the more northern specimens."

78. *Parnassius smintheus*, Doub.-Hew.—My Laggan capture was a male, on what I have referred to as "Slate Mountain," three miles north-east (I wrote south-east in error) of Laggan station, on Aug. 8th, 1901, a

little below timber line. That from Banff was at about the same altitude on Sulphur Mt., on Aug. 12th. During 1904 Mrs. Nicholl met with males only at Simpson River, about twenty miles north of Mt. Assiniboine, on Aug. 13th and 14th, well above tree level. I have one of these specimens, which she refers to var. *Behrii*, and is very like Holland's figure of that form. My Laggan specimen is similar, that from Banff I sent away. She also sent me a few of a very similar form labelled "Wilcox Pass, July 27th, 1907." The type of var. *nanus*, Neum., is stated in Mr. Wright's book to have been taken near Calgary.

80. *Papilio nitra*, Edw.—Dr. Skinner says that a specimen I sent him is "quite unlike Holland's figure of the type," and is probably *Bairdii* or some slight var. of it, and that he has many like it from Colorado. In Holland's figure the yellow is a trifle darker in shade, and the black bar at end of cell on secondaries lighter, otherwise some of my short series scarcely differ. Holland's figures of *nitra* and *Bairdii* appear to differ, chiefly in the intensity and extent of the black basal shading, and form of anal eye spot. The Calgary species varies somewhat in these respects, approaching both. I have a crippled *Bairdii* ♂ bred by Mr. Edwards from Colorado eggs, and I must admit that its differences from Calgary specimens have never been clear to me. *Asterias* (from Ontario) also resembles the local form closely above in the male, but differs considerably beneath. I have not taken and but rarely seen a specimen for several years.

84. *Pamphila comma*, Linn., var. *Manitoba*, Scud.—I took a male, not quite fresh, near the summit of Mt. Piran, at about 8,500 feet, on July 20th, 1904. I am not sure to which name it is exactly referable.

87. *P. peckius*, Kirby.—Fairly common some years. Pine Creek, Billings's Mill, Gleichen, and Red Deer River. July.

89. *P. cernes*, Bd.-Lec.—Head of Pine Creek, June 25th to 28th.

90. *Pyrgus tessellata*, Scud., var. *occidentalis*, Skinner. The ordinary north-western prairie form has been described as *occidentalis* by Dr. Skinner in Ent. News, XVII, page 6, March, 1906, and figured on Pl. XIII, in the October number of that year, together with *tessellata* and *syrichtus*. On page 278 Dr. Skinner states that it is "not a species, but only a form or geographical race of *tessellata*. . . . . It is smaller and whiter in colour, and the spots are larger in proportion to the ground colour." He has specimens from N.-W. T. (Geddes), California, Arizona, and Texas. One of my specimens bears his label. Though far from common here in the hills, it is usually very common all over the prairies

round Gleichen, and from there to the Red Deer River north-east. It is either very playful or pugnacious, I am not sure which, and a great pest when one is after other small species. It darts up to another species on which the collector has his eye, goes through a kind of lightning three-card-trick performance for about a second, then darting as rapidly away, so distracts the eye as to confuse the beholder's power of distinction.

93. *Nisoniades persius*, Scud.—Dr. Dyar refers my form to *afranius*, Lint., but Dr. Skinner, confirming his previous identification as *persius*, says: "*Afranius* is at best only a local race of *persius*."

ADDITIONAL RHOPALOCERA.

570. *Melitæa acastus*, Edw.—Rather common locally on the Red Deer River bottom, north-east of Gleichen. In coulee bottoms. End June to middle July. I had this species for some years under the name *palla*, and have probably sent specimens out as such.

571. *Phyciodes nycteis*, Doubl.-Hew.—Recorded from Edmonton in Skinner's Catalogue. It was recorded thence by Geddes.

572.—*Grapta silenus*, Edw.—Mrs. Nicholl records the capture of two specimens at Banff, Aug. 30th, 1904. I have a specimen from Vancouver, received as such, and agreeing with Holland's figures, though darker, but have seen nothing like it from Alberta.

573. *G. progne*, Cram.—This seems to be less uncommon than the other Graptas occurring here, though I had not recognized it when I published my list. My dates are from Aug. 18th to May 29th, but like the rest of the genus here, it seems to go into hibernation early and come out late. I bred a specimen last fall from a full-grown larva found in a water tank, where I think it had dropped from a willow bush.

574. *Pyrameis caryæ*, Hbn.—Mr. Willing assures me that he has taken this species in Alberta. I am not aware that I ever saw it.

575. *Limenitis archippus*, Cram.—Two fine males by the side of the C. P. R. track at Gleichen station, on July 11th, 1904.

576. *Neominois Ridingsii*, Edw.—My first acquaintance with this species was with a pair presented to me by Mr T. N. Willing, from Macleod, July 2nd and 8th, 1904. Mr. Arthur Hudson next came across it on a high dry knoll near the edge of the upper bench on the north side of the Red Deer, about 50 miles north-east of Gleichen, on July 5th, 1905. We subsequently found it, on that day and the next, in several similar situations, within a mile or two of the same spot. We took both sexes. It appeared to be very local, and by no means common. I also took a

few, mostly worn, whilst on a visit to the same locality on July 23rd of last year. I observed none south of the river. In habits and flight it is peculiarly like *Chionobas Alberta*, and, indeed, it is not altogether unlike that species in habitus.

577. *Satyrus sylvestris*, Edw., var. *charon*, Edw.—This seems peculiarly erratic in its distribution. I never met with it until 1904, when I took three males, quite fresh, on, and in coulees near, the Red Deer River flat north-east of Gleichen, on July 9th. I found it on both sides of the river, but saw no others. It was evidently just appearing. Mr. Hudson and I failed to find it there in early July of the following year, nor did I see any when there between July 23rd and 27th of last year. It occurs at Banff, as Mrs. Nicholl took it there in 1904, and I saw one in the museum labelled by Mr. Sanson, "Sun Dance Canyon, July 18th, 1906." Mrs. Nicholl tells me she found it just coming out on Kootenai Plains in mid-July of last year, and I found it, rather sparingly (as I did any other butterflies), at and below Windermere, on the Upper Columbia, B. C., from July 10th to 14th. It appears to be a mountain species, but as it occurs on the Red Deer, I cannot understand why, during 14 years' collecting, I should have had no records from within sixty miles of Calgary. Geddes records it from "Garnet Ranch" (Pincher Creek), and I have a specimen taken by a non-entomological friend at Mt. Head, in 1906. *Sylvestris*, by the way, is really the variety. Holland says: "The form with obsolescent ocelli has been named *sylvestris* by Edwards." Edwards, however, in Butt. N. Am., III, says: "It is *charon*, bandless on under hind wing; and this variation is not uncommon wherever the species is found." I have this variety from the Upper Columbia.

578. *Chionobas Brucei*, Edw.—Mr. Edwards in his Volume III says: "Mr. Bean reports finding *Brucei* at Laggan, Alberta." This is probably an error, as in part of the same work, published several months later, he quotes from Mr. Bean: " . . . On a mountain near Hector, B. C., two miles west of the Alberta Province line, . . . lives *Chionobas Brucei*, never yet observed at Laggan, only nine miles distant." Mrs. Nicholl kept a sharp lookout for it during her five or six weeks' collecting in those regions during 1904, but failed to come across it. But she found it in considerable numbers far to the north of Laggan during the latter half of July, 1907. She writes: "I have taken *Brucei* in plenty. It is evidently a more northern species than *Beanii*, and I think harder to catch. . . . The first place I took it was on a mountain at the head

of the North Forks of the Saskatchewan, flying with *Beanii*, and it was common on all the high mountains north of that." I am indebted to her for a dozen specimens, both sexes. These are all labelled, "Sheep Mountain, July 30th," and agree with *Brucei* from Colorado. Mr. Sanson took it on Sulphur Mountain, Banff, last year (J. Fletcher).

579. *Lycæa aquilo*, Bdv.—Rather common on Mt. Piran, from about 6,500 to 7,500 feet, on July 20th, 1904. Not having access to my collection of blues at present, I cannot be sure from memory that it does not occur below and above these limits. Mrs. Nicholl reports it common far north of Laggan last year. In 1904 she did not come across it between Banff and Mt. Assiniboine, but found it locally abundant near Lake O'Hara and Hector, B. C., and says: "It fairly swarmed on the damp patch at the head of Lake Louise" (July 21st). I bred a specimen on July 29th last from a larva found full-grown, on a rock in sunshine, far above timber, about 7,500 feet, on Mt. Stephen, Field, on July 7th.

580. *L. Scudderii*, Edw.—I am convinced that some of the forms referred to under this name in my notes on *melissa* are distinct from that species. I took a few females at Laggan, near the station, on July 18th, 1904, which were quite different from *melissa* females, and which I associated with males I had taken near Calgary, where it appears to be rare in places where I have collected. In the absence of my collection, I can make no comparisons.

581. *Pieris occidentalis*, Reak.—I take this species here as well as *protodice*. (Cf. my notes on that species). I have six west British Columbian specimens in my collection. Mrs. Nicholl says in her 1904 report: "Var. *calyce* is the high mountain form of *occidentalis*, and is much paler on the under side, and the veins yellow." A specimen sent me by Dr. Barnes as *calyce* is, however, the dark form. Holland does not mention *calyce*, so I am here in the dark. Moreover, the high mountain specimens I have taken are of the dark form. I saw four or five together on a high bare ridge of Mt. Field, about 7,500 feet, one of which I caught. I also took one at about the same altitude on Mt. Stephen, and several as high as the extreme summit of Piran. I doubt whether it breeds above tree level, and both light and dark forms occur at Calgary. All Calgary specimens bearing dates between April 21st and May 22nd are the dark form, and those from June 24th to Aug. 20th—two of these from Gleichen—are lighter, some very light and like *protodice*. The high mountain dark specimens are all July. There would seem to be two broods on the prairie, the early one the darkest. It is much less scarce than *protodice*.

582. *Colias pelidne*, Bd., var. *Skinneri*, Barnes.—This form should not be associated with *interior*, which I listed in error as *pelidne*. Mrs. Nicholl says that this is a very common butterfly over the whole of the higher Rockies in August, from about 5,000 to 6,500 feet. It may be taken right up to the timber line. She found it far north of Laggan in 1907. I took a specimen on Fairview on July 19th, 1904. I have a male from Yellowstone Park, one of the type localities. This sex resembles that of *Scudderi*, and it is compared with that species in the description. But in females of *Skinneri* the outer border somewhat resembles those of *interior*, whereas the female of *Scudderi* is nearer to that of *Alexandra*.

583. *Pyrgus centaureæ*, Ramb.—I took two worn specimens on Mt. Piran on July 20th, 1904, one at Agnes Lake, the other about 1,000 feet above it and above the timber, = 7,500 feet. One of these has been labelled "*centaureæ* undoubtedly" by Dr. Skinner. Mrs. Nicholl, during the whole of her 1904 trip, only took one specimen, "very high up, above Lake Louise." In 1907 she took one on Brobokton Pass in August, which was possibly a second brood. She says: "I have two that Simpson got me early in May." Mr. Jim Simpson was her guide and packer. I took a splendid specimen below timber line on a mountain about eight miles south-east of Windermere, B. C., on July 13th last, flying with worn *cæspitalis*. It is not on the B. C. list, though recorded from that Province in Holland's book.

(To be continued.)

DESCRIPTIONS OF SOME NEW MICROLEPIDOPTERA FROM PENNSYLVANIA.

BY AUGUST BUSCK, U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

Gnorimoschema alaricella, n. sp.—Labial palpi whitish, sprinkled with blackish scales, especially externally; terminal joint with a black spot at the base and a broad black annulation just before the tip. Face, head and thorax white, heavily sprinkled with fuscous. Fore wings with the bluish-white ground colour nearly obscured by darker scaling of black, dark fuscous and brown, which suffuses the wing without definite pattern, though with the effect of diffused longitudinal streaks. On the middle of the wing is a very indistinct brown ocellate spot, with black centre, and on the fold below it is another similar but still less distinct spot; both of these are easily effaced and lost in the general dark scaling. Cilia gray. Hind

wings dark fuscous, with ochreous-tinted cilia. Abdomen with basal joints velvety-yellow above; tip and under side dark fuscous. Legs dirty-yellow, dark mottled exteriorly; tarsi blackish, with narrow indistinct ochreous annulations. Alar expanse, 18–19 mm.

Habitat.—Oak Station, Alleghany Co, Pa. (F. Marloff.)

Type.—U. S. N. M., No. 11557.

A fine large species, typical of the genus, intermediate between *tetradymiella* and *Banksiella*.

Gelechia fluvialella, n. sp.—Labial palpi dirty-ochreous, speckled with dark brown exteriorly; brush moderate, rounded, hardly divided. Face iridescent-brown. Antennæ dark purplish-brown. Head and thorax light brown. Fore wings light brown, with a strong purplish sheen, especially towards apex; exterior edge of the cell and the apical veins roughly indicated by ill-defined, purplish-black longitudinal lines, more or less confluent towards apex. Cilia ochreous, dotted with brown. Hind wings light fuscous. Abdomen dark purplish-fuscous. Legs blackish, with narrow ochreous annulations on tarsal joints. Alar expanse, 18–20 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff.)

Type.—U. S. N. M., No. 11558.

A plain-looking species nearest *ochreostrigella* and *ochreosuffusella*, but differing from the former by the dark brown thorax, from the latter by the unmottled basal half of the fore wings and the less defined striation.

Borkhausenia ascriptella, n. sp.—Labial palpi light ochreous. Face shining straw-coloured. Antennæ straw-coloured; in male with long (3–4) ciliation and slightly serrated towards the tip; basal joint with strong pecten. Head and thorax straw-coloured. Fore wings shining straw-coloured, sparsely sprinkled with single black scales and with black markings as follows: extreme base of costal edge black; an ill-defined short black longitudinal streak on the middle of the cell; a larger round black dot at the end of the cell and a small black spot on the fold. Cilia whitish-yellow. Hind wings light fuscous, cilia ochreous. Abdomen and legs ochreous; front legs black on anterior side. Alar expanse, 10.5–11.5 mm.

Habitat.—Plummer's Island, Potomac River, Md. (Busck.) Oak Station, Pa. (F. Marloff.) Pittsburg, Pa. (H. Engel.)

Type.—U. S. N. M., No. 11559.

The species has the colour of and a certain general resemblance to *Tinea pellionella*.

The antennal pectination in the males is rather longer than normally found in this genus, but the species is undoubtedly rightly placed near *pseudospretella*, Stainton.

Epermenia albapunctella, n. sp.—Labial palpi blackish-fuscous; inner side of second joint ochreous. Face, head and thorax blackish-fuscous. Antennæ dark fuscous; basal joint with strong pecten. Fore wings dark fuscous, mottled with lighter fuscous, black and brown scales. An ill-defined, broad, blackish fascia across the middle of the wing is preceded and followed by lighter patches. On the end of the cell is a round white dot, preceded and followed by a black longitudinal dash. Apical cilia blackish, tornal cilia gray. Before the middle of the dorsal edge is a large black scale tooth, followed by a smaller one beyond the middle, and this by two still smaller. Hind wings dark fuscous; cilia gray. Abdomen and legs fuscous; tarsi black, with ochreous annulations. Alar expanse, 13 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11560.

One of the small dark species of this genus, but at once distinguished from all described species by the conspicuous pure-white dot at the end of the cell.

Batrachedra placendiella, n. sp.—Labial palpi blackish-fuscous; terminal joint with an ochreous annulation at base and with the extreme tip ochreous. Face light iridescent-fuscous. Head and thorax dark fuscous. Antennæ dark purplish-fuscous, with narrow black annulations. Fore wings blackish-fuscous, slightly sprinkled with white scales; a black longitudinal streak on the fold at the middle of the wing, with a smaller, nearly effaced, black spot obliquely above it on the disc, and a black longitudinal streak within the edge above tornus. Cilia light fuscous. Hind wings dark fuscous, with lighter cilia. Abdomen dark purplish-fuscous, with extreme anal tip ochreous; in the female with short protruding horny ovipositor, clothed with long erect hairs. Alar expanse, 11 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11561.

This is exceedingly close to *Batrachedra salicipomonella*, Clemens, of which I have bred specimens from willow galls, Washington, D. C. It

corresponds in general colour and markings, though without the longitudinal white streak, mentioned by Clemens, which, however, is not always very pronounced in his species. But the present species is a more robust insect with broader wings. Venation typical, with 6 and 7 separate in the fore wings, 5 and 8 absent. Hind wings with all veins present.

Batrachedra trichella, n. sp.—Labial palpi light ochreous, with a small black spot on extreme side of second joint. Face very light straw-coloured, iridescent. Head and thorax light ochreous. Antennæ smoky-ochreous. Fore wings at base light ochreous, this colour gradually deepening toward apex, where it has a purplish-brown tinge. Basal third of costal edge thinly black; at apical fourth is a short longitudinal black streak on the middle of the wing, and at the base of the apical cilia is a short tranverse black streak. The wing is sparsely sprinkled with scattered black scales. Cilia light ochreous. Hind wings light ochreous. Abdomen fuscous. Legs ochreous. Alar expanse, 15–16 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11562.

A large slender species nearest the European *Batrachedra pinicolella*, Duponchel.

Venation typical, with 6 and 7 in fore wings stalked, 5 and 8 absent; hind wings with all veins present.

Elachista orestella, n. sp.—Oral parts, face, head and thorax pure white. Antennæ smoky on outer half. Fore wings white, with a slight yellowish tinge; on the fold equidistant from the base and the apex of the wing lies a small oblong deep black spot, and obliquely above it is a similar black spot at the end of the cell. Cilia and hind wings white. Abdomen whitish-fuscous. Legs smoky-white. , Alar expanse, 11 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11563.

A very striking and easily-recognized species. Venation typical; fore wings with 11 veins, vein 4 absent, 6 and 8 out of 7. Hind wings with 7 veins, 6 and 7 stalked, 5 absent.

ERRATUM.

On page 161, sixth line from the bottom, the following words were inadvertently omitted by the transcriber after *Phyton pallidum*, Say: "And two specimens of *Cregya oculata*, Say."

ONE OF OUR NEGLECTED "GREENS" (GEOMETRIDÆ).

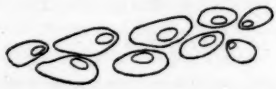
BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

This little moth I find generally associated, when present in collections, with *phyllinaria*, Zell., which in reality is rather a rare species. For a long time I have been aware of its distinctness, but I could obtain no clean, fresh specimens of the latter for comparison. Packard's description (*Zelleraria* = *phyllinaria*), in Mono. Geo. Moths, p. 370, is an excellent one, and, as he points out, the front is *green* and the colour more solid, without irrorations, and the cross lines finer and firmer than in many species. The following description should make the differences specific:

Chlorochlamys vertaria, n. sp.—Expanse, 14–15 mm. Palpi deep ochre, tipped with red. Front brownish-red. Antennæ and along costa ochreous. Thorax and all wings above pale sea-green, the latter finely irrorate with whitish. Cross lines yellowish-white, distinct. On fore wings basal line crosses in two rather strong outward curves, one from costa to median vein, thence another to inner margin. Extra discal starting from costa, two-thirds out, nearly straight at origin, rounds somewhat outwardly to vein 5, where it makes another outward curve to vein 1, and thence outward in a short straight line to inner margin, well within anal angle. Sometimes this line makes a single broad outward sweep to vein 1. No discal dots above or below. Fringes rather long, green at base, white terminally. Hind wings without basal line. The extradiscal, an extension from fore wings, runs subparallel with margin, but as in fore wings, with two outward curves and outward straight line to inner margin, the short curve opposite cell being sharper and well marked. Beneath greenish-white, the extradiscal white lines above faintly showing through; costa rather broadly ochreous. Abdomen above and beneath, and legs, white, a little tinged with ochreous, the fore tibiæ washed with brownish-red.

Type.—♂ from Phœnix, Ariz. (ix, 18, '07), and ♀, Phœnix, Ariz. (ix, 16, '07), through Dr. R. E. Kunze, in my collection.

Co-types.—Three males.



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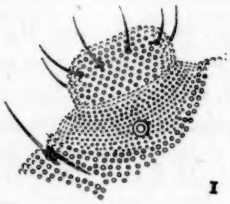

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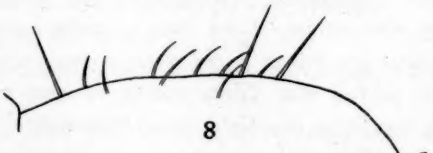

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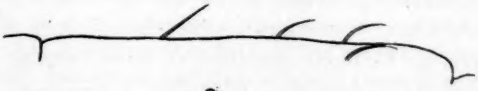

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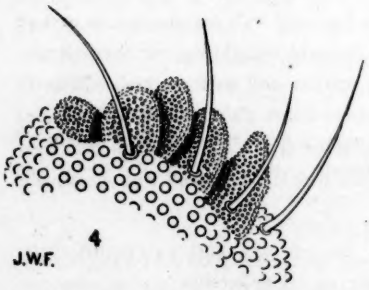

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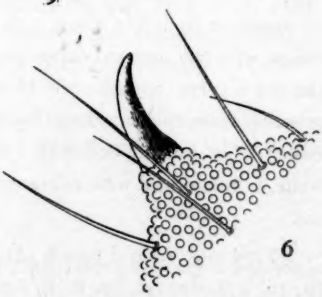

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THE GOLDEN SNOW-FLEA.

THE GOLDEN SNOW-FLEA, *APHORURA COCKLEI*, N. SP.

BY JUSTUS W. FOLSOM, URBANA, ILL.

(Plate 5.)

In British Columbia there is a minute yellow Collembolan that appears in crowds so dense as to cover the snow with a carpet of gold.

This species was discovered by Mr. J. W. Cockle, of Kaslo, B. C., whose specimens and data sent to Doctor Fletcher were by him referred to the writer.

The literature on Collembola contains many references to snow-fleas, and one author, Dr. R. Latzel, has made a convenient summary of all that has been written on the subject (Carinthia, II, Nos. 5 and 6, Mitt. Naturh. Landesm. Kärnten, 1907).

In the United States only "black" snow-fleas have figured in the literature, and the species that has done most to deserve the name of snow-flea is *Achorutes nivicola*, Fitch (see Psyche, Vol. 9, p. 315), a dark blue species that swarms on the snow every year, in Massachusetts and New York, and doubtless elsewhere. It is not often reported, however, since it becomes active at a season when most of the collectors are still dormant.

When most of the insects also are hibernating, Collembola are active—even before *Boreus* appears, and before the winter species of Perlidæ, Culicidæ, Chironomidæ, Bibionidæ and Muscidæ are on the wing. Collembola revive at a temperature that is too low to arouse other insects; in the Arctic region they flourish when other insects fail.

During his experience of many years in the mountains, Mr. Cockle saw this golden snow-flea for the first time in 1906, and again in 1908; and his inquiries among men who spend most of their time among the snows have not enlightened him as to the occurrence of the species in other localities. He has not found it on his summer trips among the glaciers; in fact, he has found it only at Kaslo, on a steep bank one hundred feet above the river, at an altitude of 2,250 feet, and surmises that it came from the river. None of the Collembola are known to be aquatic in their development, however, though some of them frequent the surface of water, and most of them require a moist atmosphere; and the snow-fleas develop in the soil or under loose bark or moss. This genus *Aphorura* is essentially, but not altogether, terrestrial; but the black snow-fleas of the genus *Achorutes* develop under bark, as a rule, where they can be found in the dead of winter, long before they appear on the snow.

June, 1908

Mr. Cockle is as yet alone in his enjoyment of the spectacle presented by the golden snow-flea. He writes enthusiastically about these lively creatures that illumine the snow over patches of several square yards. As the snow melts, the snow-fleas are carried off in the currents of water and deposited on the surfaces of the pools, where they accumulate in immense numbers. They cannot sink in water, on account of their clothing of bristles, and even in strong alcohol they are not easily immersed without being shaken in the fluid, unless the fluid is hot.

The golden snow-flea loses its colour when it dies out of doors in the pools, and becomes dirty white; but when the insect is preserved in alcohol or Canada balsam, the pigment is singularly permanent; the specimens that Cockle sent out two years ago are now as vividly yellow as ever.

Strictly speaking, the colour is not golden-yellow, but lemon-yellow—even though the former would be preferable on account of its associations.

Aphorura Cocklei, n. sp., is lemon-yellow and slender. Head with one pseudocellus behind the base of each antenna (Plate 5, Fig. 1). Postantennal organ of eight to ten papillæ, which vary in form within the limits of oval, ovate and elliptical (Figs. 2, 3). Antennæ three-fourths as long as the head. Antennal organs five-lobed (Fig. 4), the lobes being stout, rounded, and suboval, subovate or subconical. The number of dorsal pseudocelli to each body segment is successively (Fig. 5) 0, 2, 2, 2, 2, 2, 2, 4, 0. Anal spines two (Fig. 6), stout, curved, subequal in length to one of the ungues, and seated on separated, or nonconfluent, papillæ. There is no trace of a furcula. Claws similar throughout, the first pair being slightly larger than the rest; unguis (Fig. 7) stout, feebly curved, untoothed; unguiculus two-thirds as long as unguis, with semi-elliptical basal lamella and acuminately prolonged apex; tenent hair single, simple, and as long as the unguis. Clothing of minute curved setæ and fewer but longer stiff setæ. Maximum length, 1.8 mm.

Tullberg's description of *Aphorura sibirica* (Collembola borealia, 1876, p. 40) applies, so far as it goes, to this snow-flea, but applies equally well to a second species; for the description is broad enough to include at least two distinct species. The other of these is a form which Dr. Karl Absolon found in the caves of Moravia; and because it fell under Tullberg's description of *sibirica*, he retained that name for the cave form, and at the same time gave a good description of the species (Zool. Anz., Bd., 23, 1900, p. 408). This description of *Aphorura sibirica*, Tullberg-Absolon, fits our golden snow-flea, which has, however, certain characters that Absolon did not mention.

Upon finding that Cockle's species agreed in every respect with Absolon's description, I sent specimens and drawings to Absolon, in order to determine whether the two species were the same. He informed me that they were not; that his species was always white, and not so slender as the yellow one; and he sent me eight specimens of his cave species, from which to draw my own conclusions.

I agree with him that the two species are distinct. They are sharply separated by striking differences in colour and form, and by less striking but not less constant differences in the antennal organs and the clothing. In *sibirica*, Tullberg-Absolon, the lobes that constitute the antennal organ are slender and finger-like—quite unlike those of *Cocklei*. In *sibirica*, T.-A., the minute curved setæ of the body are few; in *Cocklei* they are numerous, and interspersed with longer and stiffer setæ; and the arrangement of the setæ is conspicuously different in the two species, as is indicated in Figures 8 and 9.

Since the golden snow-flea refuses to take the name of *sibirica*, we must give it a new name; and it is appropriate, as Dr. Fletcher suggests, to name this energetic entomological inhabitant of British Columbia after Mr. J. W. Cockle.

Four hundred and ninety-nine types, Kaslo, B. C., Jan. 31 and March, 1906; Feb. 23, 1908; J. W. Cockle. Many of the types have been sent to the U. S. National Museum, Washington, D. C., and to the Museum of Comparative Zoölogy, Cambridge, Mass. Others will be sent to specialists in this order of insects.

PLATE 5.

Fig. 1. *A. Cocklei.*—Base of left antenna, × 200.
" 2. " " Postantennal organ of right side, × 1234.
" 3. " " " " " " "
" 4. " " Right antennal organ, × 823.
" 5. " " Dorsal pseudocelli, × 43.
" 6. " " Right anal spine, × 400.
" 7. " " Left foot of first pair, × 400.

Fig. 8. *A. Cocklei.*—Setæ near median dorsal line of metathorax, × 300.

Fig. 9. *A. sibirica.*—Setæ near median dorsal line of metathorax, × 300.

BROWN-TAIL MOTHS AT GARDINER, MAINE.

It is gratifying to learn that but few Brown-tail Moths' nests are to be found in this vicinity this spring, as compared with the number found last year at this time. In the worst infested orchards last year where 100 nests were taken, not more than 4 or 5 are to be found this year. While they were very thoroughly picked last year, it is hardly to be expected that that is the entire cause for the decrease this year. Most of the nests examined last year did not seem to be in a healthy condition—the larvæ were very stupified and many were dead, but I am sorry to say that all that I have opened this spring are very lively and apparently ready for business. As this is not far from the northern boundary of the Brown-tail Moth area, it is interesting to note that we have had one year of a decided decrease in their numbers.

Two years ago not more than 20 nests were found in Gardiner, last year about 2,000 were gathered in, and this year 200 would, perhaps, be a fair estimate.—A. T. REYNOLDS, Gardiner, Maine.

TWO NEW SPECIES OF ASILIDÆ FROM BRITISH COLUMBIA.

BY JAMES S. HINE, COLUMBUS, OHIO.

The two species of Robber Flies here described as new were collected by Messrs. R. V. Harvey and R. S. Sherman, who reside in Vancouver, and who have sent in many other interesting species of Diptera. In one of his annual publications Dr. Fletcher has adopted the plan of reporting interesting captures of insects from the various sections of Canada, and it is notable how many of those reported in 1905 and 1906 were taken in British Columbia. The insect fauna of the Province soon will be fairly well known if the dozen or more resident collectors maintain their present interest in the matter. Success to their efforts.

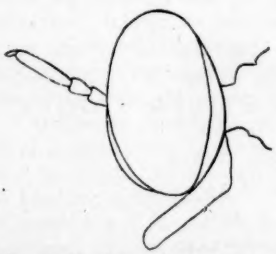


FIG. 7.—Side view of the head and antenna of Cophura albosetosa.

Cophura albosetosa, n. sp. — Black, thorax covered with gray dust, abdomen shining blue-black, with white spots on the sides of the segments, wings brownish-hyaline, body and legs clothed with white bristles and hairs. Length, 7 to 9 mm.

Face slightly, but evenly convex and rather wide, front clothed with silvery dust and white hairs, which are longest and coarsest, and sometimes brownish near the oral margin. Ocellar tubercle rather prominent; posterior orbits thickly clothed with rather fine white hairs. Antenna black, first two segments with white bristles; third segment of uniform width, with a short style bearing a small bristle at the tip; length much in excess of the first two segments together. Thorax clothed with gray dust and furnished with white hairs, which on the disk may have a brownish tinge; scutellum clothed with gray dust and white hair; legs black, with white bristles and hairs, hind tibiæ and tarsi somewhat enlarged and with short golden pile on part of the anterior surface; wings uniformly very dilute-brownish, so dilute, in fact, that they might well be said to be hyaline.

Male abdomen shining blue-black, of nearly uniform width throughout its length. Each segment, from one to six on either side, with a distinct white spot on the posterior margin.

Female abdomen shining blue-black, widest near the middle of its length, each segment, from one to five on either side, with a white marking on the posterior margin. These markings are larger and longer than in the other sex.

Two males and a female from Hope Mountains, B. C., July 19, 1906, and a female from Similkameen, B. C., July 20, 1906.

There seems to be some uncertainty as to the limits of the genus Cophura as used by the different authors, and it is therefore with a certain hesitation that I have concluded to place the present species in it, but from the standpoint of the recent catalogue by Aldrich, who follows Williston, *albosetosa* may be included. It has affinities with some of the species placed in the genus Taracticus, but the abdomen shows no sign of punctulation. It is probable that when a critical study of sufficient material is possible the limits of Cophura will be restricted. Although the insect has a general resemblance to some of the species of Cyrtopogon, it does not belong there because of the claw-like spine at the end of each front tibia.

NIGRASILUS, n. genus.

Front and face of ordinary width, face widest below. Facial gibbosity rather prominent and with numerous bristles. Third segment of the antenna rather narrow, and a little longer than the first two together, arista only about half as long as its segment. Thorax with bristles on the posterior part and several bristles on the margin of the scutellum. Wing

venation as in Asilus in the restricted sense. Posterior margins of the abdominal segments without bristles that differ in length from those on other parts of the abdomen. Female genitalia plainly conical; male appendages plainly bent upward near the middle of the length.

Nigrasilus nitidifacies, n. sp.—Black, wings slightly fumose, face just beneath the antennæ shining black; female with conical oviduct. Length, 12 to 15 mm.

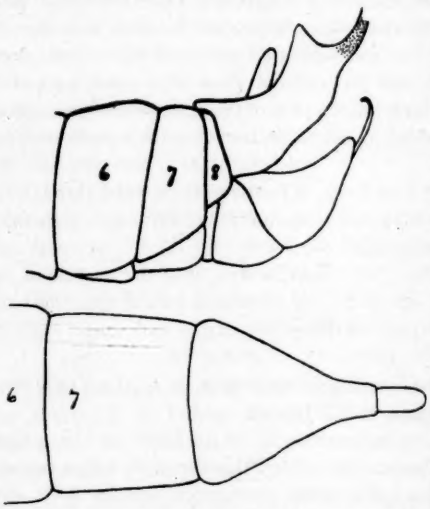


FIG. 8.—Nigrasilus nitidifacies.—Side view of the tip of the male abdomen (upper diagram). Dorsal view of the tip of the female abdomen (lower diagram).

Facial gibbosity rather prominent, and clothed with black bristles above and white bristles below; face just beneath the antennæ shining black, otherwise clothed with gray dust, which is most pronounced along the entire margins of the eyes; beard white; occipito-orbital bristles all black. Ground colour of the thorax black, but thinly covered with gray dust, four to six black bristles on the margin of the scutellum; wings slightly fumose, almost hyaline on basal parts. Femora all black, with fine white hair and black bristles; tibiæ and tarsi more or less dark red, approaching black in parts. Hind tibiæ each with three or four black bristles on the front side near the middle. Abdomen black above, with gray hind borders to the segments.

A male specimen collected in the Hope Mountains of British Columbia by R. S. Sherman, July 16, 1906, and a female, collected on Vancouver Island, July 2, 1903, by R. V. Harvey.

This insect has the general appearance of the species of some of the other genera of the subfamily Asilinæ, but if Loew's classification is to be followed and his subgenera raised to the rank of genera, as is the tendency, it must stand in a new genus, mainly on account of the black colour and the very peculiar genitalia of both sexes.

NEW SPECIES OF THERIDIIDÆ.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

Theridium pictulum, n. sp.—Cephalothorax brown on sides, pale in middle, but the pale contains a large goblet-shaped dark mark. Abdomen black on base, with a median projection, followed by a narrow whitish-mottled folium, margined with black, the black of base extends on sides downward to the venter, enclosing a white spot on each anterior side. Sides of abdomen white, more or less mottled with brown, spinnerets surrounded with black, venter blackish, with a prominent median sub-triangular snow-white mark, sternum brown. Legs white, with many black bands; femora i and ii with a narrow mark below before middle, a broader one above at middle, a sub-apical ring, and a narrow apical mark; patella with sub-apical mark; tibia with basal, median, sub-apical and apical marks, none complete rings; metatarsus with basal, median and apical bands; tarsus with median band. Legs iii and iv less marked, the femora with sub-apical ring and apical mark; patella with apical mark; tibia with median and apical bands; metatarsus with basal, median and apical bands; tarsus with median band. Tibia i barely shorter than the metatarsus i. Length, ♀, 3 mm.

From Palo Alto, Calif. (Coolidge).

Theridium interruptum, n. sp.—Cephalothorax with a dark margin on the side, rest yellowish-brown; abdomen grayish, with silvery-white spots and black marks as follows: a narrow stripe each side on anterior part, on posterior part a much broader stripe each side, with obliquely-pointed bases, and extending down on sides of abdomen behind; the sides at base and near middle are also black; venter pale, with a broad black band across middle, but not reaching the sides; sternum pale, narrowly margined with black. Femora, patellæ and tibiæ of legs i and iv blackened at tip, other legs less distinctly so. Abdomen rather elongate, not much wider than cephalothorax, and somewhat flattened, truncate at base, rounded at tip, region of epigynum swollen. (Fig. 9.)

Length, 1.3 mm.; leg i, 2.4 mm.

Miami, Florida, Feb. 16, under boards on the ground (Prof. J. H. Comstock).

EURYOPIS: Table of Species.

1. Posterior dorsum of abdomen mostly silvery-white.....3.
   Entire dorsum mostly black, only a few small silvery spots, no bands on legs.....2.
2. With four or five silvery spots; legs with black line under femora .....*5-maculata.*
   With six or ten silvery spots; legs without black line .....*argentata.*
3. Tibia and metatarsus brownish, and without bands; abdomen silvery, with narrow median black stripe.....*formosa.*
   Tibia and metatarsus yellowish, banded with black.....4.
4. Cephalothorax and sternum yellowish.....6.
   Cephalothorax and sternum dark brown.....5.
5. Dorsal silvery mark extends around base; marks on legs fine and much broken up.....*scriptipes.*
   Dorsal silvery mark not around base; marks on legs in form of distinct rings .....*funebris.*
6. Legs heavily marked with fine black lines; venter silvery. *Californica.*
   Legs only slightly marked with black; venter brownish..... *Texana.*

Euryopis argentata, Emer.—This species occurs in the Atlantic Coast States.

Euryopis 5-maculata, Banks.—I have seen this only from the vicinity of Washington, D. C.

Euryopis scriptipes, n. sp.—Cephalothorax a uniform brown, eyes on black spots; abdomen black, with a silvery-white mark around on upper sides, barely or just meeting on base in front, very broad behind, and enclosing a black heart-shaped dorsal mark; sometimes the white is broader and the black is smaller and indented on its sides; venter black in middle, sides silvery, sternum black, coxæ tipped with black, the spinnerets surrounded with black; legs yellowish, densely marked with small transverse black marks, those at apex of joints heavier and forming rings, the tarsi barely, if at all, marked, the femora but little marked above; the tarsus of male palpus black, in the female the other joints marked with black. Eyes and other structure as in *E. funebris*, and size the same.

Specimens from Colorado (Oslar); Pecos and Beulah, New Mexico (Cockerell).

Euryopis Californica, Banks.—This species I have seen only from California.

Euryopis funebris, Hentz.--This species is widely distributed in the Eastern States, and also in Canada.

Euryopis Texana, n. sp.—Cephalothorax yellowish or yellowish-brown, eyes on black; abdomen mostly silvery-white, with a brown-triangular mark on middle of anterior part, narrowly bordered on sides and behind with black; venter brownish, sternum yellowish, legs yellowish, slightly marked with black at tips of joints and a few scattered dots elsewhere, mostly at bases of bristles; mandibles and palpi pale yellowish. Rather smaller than *E. funebris*.

Brazos Co., Texas.

Euryopis formosa, n. sp.—Cephalothorax uniform yellowish-brown; abdomen silvery-white, with a narrow median black stripe, constricted near middle and pointed at tip; venter brown in middle, a silvery lunule behind, black around the spinnerets and extending forward each side as a narrow line on the sides; sternum yellowish-brown; femora yellowish, beneath with bands of brown; apex brown; patellæ, tibiæ and metatarsi wholly reddish-brown; tarsi paler; femur of palpus yellowish, rest red-brown. Size and structure similar to *E. funebris*.

From Bear, Idaho (L. M. Cockerell).

Argyrodes rostratus, n. sp.—Cephalothorax brown, or yellowish-brown; eye region black; legs pale yellow; the patellæ and tips of the tibiæ yellowish-brown; sternum brown; abdomen bright silvery above, brown beneath, with a small silvery spot each side; a narrow median black stripe on dorsum from base two-thirds of way to tip; extreme tip with small brown spot. A. M. E. large, more than diameter apart; P. M. E. smaller, more than two diameters apart. Femur i nearly as long as abdomen. Abdomen triangular in side view, prolonged above behind, the tip bluntly rounded, as high behind as long. In the male the abdomen is more rounded at tip above; the eye region is elevated into a prominent hump, bearing the P. M. E. above and the A. M. E. in front, while on the clypeus there is a porrect, rather knob-like projection. (Fig. 9.)

Length, ♀, 2.2 mm.; ♂, 2 mm.; femur 1, 1.5 mm.

From Runnymede and Miami, Florida (the latter from Prof. Comstock).

Argyrodes frontatus, n. sp.—Cephalothorax yellowish, a median blackish mark behind eyes and on the sides; legs pale, tips of joints blackish; sternum pale; abdomen grayish or silvery, densely marked with blackish spots, mostly on the sides; above is a narrow median black stripe from base two-thirds of the way to tip; venter pale. A. M. E. large, about diameter apart; P. M. E. smaller, more than two diameters apart. Femur i as long as abdomen, the latter conically extended above behind, in side view it is triangular, the tip is rather broad and very plainly emarginate. Abdomen of male less extended above, but also emarginate at tip. The head of male has two short median processes; one on clypeus extending upward, and one above M. E., both bearing stiff hairs at tips. (Fig. 9.)

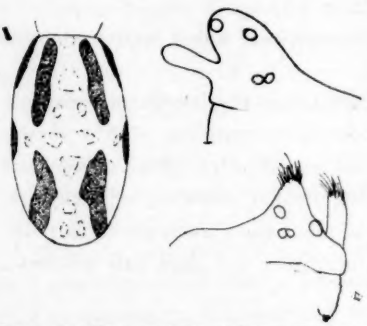


FIG. 9.—Theridium interruptum: dorsum of abdomen (on left); Argyrodes rostratus: head of male (upper right hand); Argyrodes frontatus: head of male (lower right hand).

Length, ♀, 3.1 mm; ♂, 2.7 mm.; femur i, ♀, 2.4 mm.

From Ocean Springs, Miss., Jan. (Prof. Comstock.)

Argyrodes decorus, n. sp.—Cephalothorax dark brown; palpi mostly black; legs yellowish, marked with dark brown on black; femora i brown, leaving only a pale streak each side at base; patella brown, except above; tibia brown on apical third, shading off into pale; tip of metatarsus dark; leg ii similar, but with less dark; leg iii mostly pale, only dark at tips of joints; iv mostly pale, but dark on outside of femur. Abdomen with a broad black stripe above, from base to tip, with a cross-bar somewhat before the tip; venter black, the black extending up each side above spinnerets; the abdomen behind, parts of the sides and above are silvery, or with some golden colour. Cephalothorax quite flat, head but little elevated; A. M. E. large, about one and a half diameter apart, and as far from the smaller S. E.; P. M. E. searcely two diameters apart; femur i longer than abdomen, the latter greatly prolonged above behind, so that the posterior side is twice as long as the venter; tip rounded.

Length of ♀, 3.2 mm.; height of abdomen, 3.3 mm.; length of femur i, 2.9 mm.

From San Pedro, California.

A NOTE ON THE SPECIES OF *MICRONECTA* OCCURRING IN INDIA AND CEYLON (HEMIPTERA).

BY G. W. KIRKALDY, HONOLULU, H. ISLANDS.

In the "Fauna of British India" (Vol. III, 50–51, 1906), Mr. Distant has redescribed two species only of this genus from India and Ceylon, thus omitting six previously described, three of them being old and well established.

Eleven species are now known to me from these countries, one being now diagnosed and three left to a future time.

1. *albifrons*, Motsch., =|| *striata*, Fieber, = —*ovivora*, Westw., = *siva*, Kirk.
2. *grisea*, Fieber.
3. *haliploides*, Horvath.
4. *malabarica*, Kirk.
5. *memonides*, Kirk.
6. *M-notata*, Kirk., =|| *lineata*, Fieber, = *notata*, Kirk., 1905 (by misprint).
7. *punctata*, Fieber.
8. *thelxinoë*, Kirk.

Micronecta malabarica, sp. nov.—The general characters are those of *M. albifrons*, but the tegminal picturation is very faint; there is no trace of a transverse line on the distinctly longer pronotum, and the interior margin of the vertex is also in a direct line with that of the eyes. Length, 4 mill.

Hab.—India, Malabar Coast.

P. S.—When my list of the known species of *Micronecta* was published (Ent. News, 1905, p. 261), I had not heard of five species published the same year, viz.:

1. *quadristrigata*, Breddin, from Java.
2. *ludibunda*, " " Java.
3. *fugitans*, " " Java and Celebes.
4. *pardalina*, " " Java.
5. *inflatula*, " " Java.

I also omitted *hydroporina* (Sigara), Von der Decken, 1873, from East Africa.

I have now in the press descriptions of two new forms, *pallida* and *micra*, from Australia, so that the total number of species is now 47, of which perhaps 42 or 43 are valid. It is safe to predict that ultimately some hundred species or so will be known.

CONCERNING THE NOTONECTIDÆ AND SOME RECENT WRITERS ON HEMIPTEROLOGY.

BY J. R. DE LA TORRE BUENO, NEW YORK.

These notes are called forth specifically by a paper in "La Feuille des Jeunes Naturalistes" (Rennes)[1] by A. Delcourt, entitled "De la Nécessité d'une Revision des Notonèctes de France," but they lead naturally to some considerations on recent work.

M. Delcourt claims that a revision of French Notonectids is necessary, and not being familiar with his region, we will not dispute it, but when he develops his argument it becomes necessary to differ from him. He falls at once into the error which has lead astray more than one Hemipterist, namely: that colour alone is a sufficient character for the differentiation of species in water-bugs, when in all recent work[2] it is more often than not neglected. My own careful studies of the common and abundant North American *Notonecta undulata*, Say, have made this plain to me, because here we have an insect covering a great range, and which is apt to differ greatly in series from one and the same pond, varying from a pure white to nearly black. *But they are one and the same species.* These colour variations in *N. glauca* appear to trouble M. Delcourt very much. This, no doubt, is due to his unfamiliarity with any work later than Dr. Puton's very meritorious "Synopsis des Hémipteres Hétéroptères de France." It is naturally not to be expected that a French author should be posted on what is done on this side of the water. But why ignore Kirkaldy's "Revision of the Notonectidæ"?[3] In this the entire question of the synonymy of *Notonecta glauca* is gone into, and he indicates the different varieties into which the species may be differentiated, all this after a careful examination of the types, so this work may be considered nearly definite. And, further, the same author published recently "*Uber Notonectiden*,"[4] in which wherever corrections in his previous work were necessary he made them, thereby bringing to date his earlier "Revision." Had the French reviser been familiar with these two articles he would not have deemed it necessary to propose the work he contemplates, even going to the extent of promising a revision of Palæarctic forms!

As for the remainder of M. Belcourt's paper, once he departs from the speculative and arrives at the concrete, it is not entirely valueless.

1. No. 442, Aug. 1, 1907, pp. 198-207.
2. Cf. Montandon, Kirkaldy, Horvath, etc.
3. Trans. Ent. Soc. Lond., 1894.
4. Wien. Ent. Zeit.

He gives directions for collecting and preserving as well as for breeding, and although he gives few details, he appears to have succeeded in breeding *N. glauca*, but does not describe the nymphal stages. He claims that they have *six* moults, one on emerging from the ovum, which I have observed in *N. undulata*. But I deem this first moult merely the casting off of the amnion, and not a true moult of an outgrown skin. The French author has solved the food problem by giving the nymphs young mosquito larvæ, which I also have found suitable. The remainder of his paper covers nothing not heretofore known and pointed out in detail in this country.

Now, as to the second count. Certain Hemipterists appear to consider a proper understanding and use of synonymy a purely unnecessary luxury. Therefore we find in much work that decidedly erroneous names are employed, both generic and specific. Furthermore, old errors are cheerfully adopted and popularized, and no question is ever made as to the work of certain authors, who are very Mohammeds of Hemipterology, and whose dictum is final. To-day Hemipterology is as much neglected as it was fifty years ago. There are perhaps some half-dozen workers who keep it alive; but outside of these the others who take interest in this branch of the science are apparently willing to let some one else do the work.

As to the philosophical side of the science, since Schjodte, who has attempted to place the classification of the Order on a firm foundation of phylogeny? Reuter, Bergroth, Stal, but principally the former. To-day, Kirkaldy is working in this direction, and he is proposing changes of so radical a nature that before they are accepted a complete readjustment of our ideas becomes imperative. And even then such new conceptions of relationships may obtain that his scheme may be rendered obsolete. But to-day a system of classification which lumps together such diverse forms as the *Nepidæ*, with the other so called Cryptocerata, is decidedly in need of reform along more scientific lines.

BOOK NOTICE.

Os Culicideos do Brazil, pelo Dr. Antonio Goncalves Peryassu. Trabalho do Instituto de Manguinhos, Rio de Janeiro. Typographia Leuzinger, 1908.

This interesting work on the mosquitoes of Brazil contains over 400 pages, with 26 plates. It is written wholly in Portuguese, which will make

it especially valuable for local use. The book is the result of two years of assiduous labour, as Dr. Peryassú tells us, at the Instituto de Manguinhos in Rio de Janeiro, Brazil, under the direction of Dr. Oswaldo Cruz and Dr. Arthur Neiva. It is a creditable production. Dr. Peryassú records about 130 species of mosquitoes from Brazil (in one place he gives 131 species, in another 127), but there must be many more to be found in this large region. Mr. Busck found 90 species in the Panama Canal Zone during a short stay of but three months. The author's observations on larvæ are especially interesting, though we wish more details had been given of the Culicine forms. The Anophelines are most favoured, no doubt from their pathological connections, and receive more detailed study. The eggs of *Chagasia farjardoi*, an Anopheline, are most curious objects, resembling floating dipterous pupæ, one end modified like a respiratory organ.

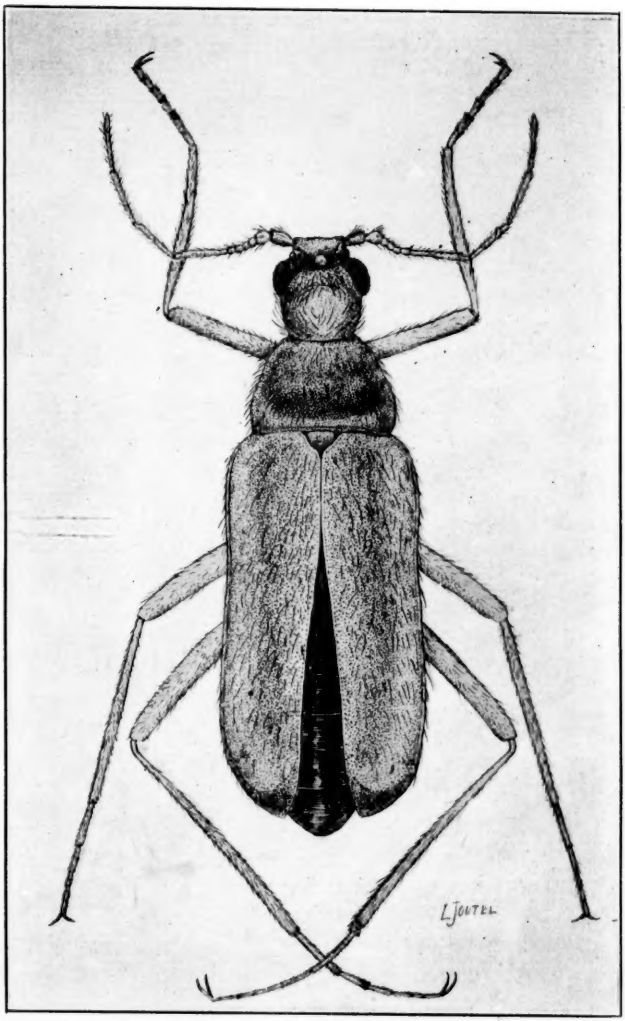
Our author has adopted the classification of Lutz, as modified by Theobald. Our objections to this classification need not be here repeated, as they have been set forth elsewhere, and the classification has many points of excellence, although it needs simplification. That Dr. Lutz's classification should be used in a publication emanating from Brazil is, of course, entirely fitting. Some of the records of species, more especially those cited from other authors, will require critical revision. We notice, for example, *Dendromyia Smithii*, Coquillett, credited to Rio de Janeiro on the authority of Farjado, which is to say the least a doubtful record.

Our author has entirely omitted all references to the places of publication of species and genera. We had hoped to learn the exact dates and references to Dr. Lutz's and Dr. Cruz's species, published in Brazilian medical journals not available in Washington, but were disappointed.

A number of new species are described, mostly credited to other authors, Dr. Peryassú having reserved for himself but one species so far as we notice. Unfortunately Dr. Peryassú's generous intentions will fail, for there is no evidence that any of the descriptions were written by another than the author himself, and, as we understand the rules, new names are to be credited to the one first publishing them, not to one who had suggested the name or labelled a specimen therewith. Therefore all the new species in the book must be attributed to Dr. Peryassú.

HARRISON G. DYAR.

Mailed June 5th, 1908.



IGNOTUS AENIGMATICUS—ADULT MALE.